REMARKS

Applicant respectfully requests consideration of the subject application as amended herein. This Amendment is submitted in response to the Final Office Action mailed April 15, 2005. Claims 1, 2, 5, 7, 9-14, 17, 19, 21-26 and 28 stand rejected. In this Amendment, claims 1 and 13 have been amended and claims 5, 11-12, 17, 23-26, and 28 have been cancelled. No new matter has been added.

35 U.S.C. § 103 Rejections

Claims 1, 2, 5, 7, 9, 10, 12, 13, 17, 19, 21, 22, 24-26 and 28 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ghoshal, et al., (U.S. Patent No. 6,658,861, hereinafter "Ghoshal"), and in view of Bonsignore, et al. (U.S. patent No. 6,432,320, hereinafter "Bonsignore"). Claims 11 and 23 are rejected under under 35 U.S.C. §103(a) as being unpatentable over Ghoshal and Bonsingnore and further in view of Cannell, e t al. (U.S. patent No. 6.729,383, hereinafter "Cannell"). As discussed below, the pending claims are patentable over the above references.

As noted above, independent claims 1 and 13 have been amended and independent claim 25 has been cancelled.

Ghoshal does not teach or suggest, inter alia, as presently claimed in claim 1: "a fluid loop coupled to the plate to circulate fluid and have the fluid absorb heat from the plate, the fluid loop to thereafter pass the fluid to a heat exchanger, the fluid containing magnetic nanoparticles and deionized water, to facilitate cooling of the heat generating device." Similar limitations are present in independent claim 13.

Applicants respectfully submit that there is no motivation to combine the cited art to arrive at the presently claimed invention. In particular, Applicants respectfully submit that the cited art teaches away from the presently claimed invention.

Ghoshal teaches that the use of water in forced fluid cooling has limitations. In particular, Ghoshal teaches that the low thermal conductivity of water limits its effectiveness as a heat transfer fluid. So, the only mode of transfer of heat [for water] is convection. Transfer of heat by conduction [for water] is negligible. Also, water is circulated using mechanically moving pumps that are largely unreliable, occupy large volumes, and contribute to vibration or noise. Ghoshal also teaches that methods provided by the prior art [using water] do not satisfactorily address the issue of removal of heat at a desirable distance away from a high power density device.

Cannell teaches that water is the preferred liquid for cooling because it is environmentally benign, has a low cost, its availability, simplicity of design, non-health hazard, low corrosivity, compatibility with most materials, ease of use, etc. However, Bonsignore and Cannell do not teach or suggest the desirability of using metallic nanoparticles in deionized water to cool processors, chipsets, graphics controllers or memory controllers.

As discussed above, Ghoshal specifically teaches away from using water-based coolants to cool processors, chipsets, graphics controllers or memory controllers. In addition, Ghoshal teaches that electromagnetic pumps can be used with liquid metals, but does not teach using electo-magnetic pumps with a fluid containing water and metallic nanoparticles, which is able to remove heat at a desirable distance away from a high power density device.

As described in the specification, the use of magnetic nanoparticles in the deionized water allows an electromagnetic pump to be used to circulate the fluid, which

is more quiet and efficient than the mechanical pumps required for non-metallic coolants. In addition, the use of metallic nanoparticles significantly reduces thermal resistance at the thermally conductive plate. Also, the use of metallic nanoparticles allow the use of an electro-magnetic pump (i.e., a pump without mechanically moving parts) with a water-based cooling system. Thus, a water-based cooling system is provided that is able to remove heat at a desirable distance away from a heat generating device.

Thus, the present invention as claimed in claims 1 and 13, and their corresponding dependent claims, is patentable over the above references.

Applicant respectfully requests the withdrawal of the rejection under 35 U.S.C. § 103(a) and submits that the pending claims are in condition for allowance. Applicant respectfully requests reconsideration of the application and allowance of the pending claims.

If the Examiner determines the prompt allowance of these claims could be facilitated by a telephone conference, the Examiner is invited to contact Marina Portnova at (408) 720-8300.

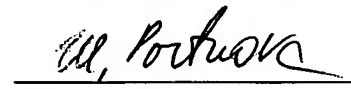
DEPOSIT ACCOUNT AUTHORIZATION

Authorization is hereby given to charge our Deposit Account No. 02-2666 for any charges that may be due. Furthermore, if an extension is required, then Applicant hereby requests such extension.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: February 2, 2006



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